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FACT SHEET

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FLY CONTROL IN POULTRY HOUSES

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One of the biggest management problems facing poultry producers is fly control. The shift from many small farm flocks to fewer large poultry operations has compounded fly problems by furnishing concentrated breeding areas in the greatly increased volumes of waste. As urbanization and rural non-farm residence increase, poultry producers will experience increasing pressures to restrict fly populations to low levels.

Several kinds of flies are found in and around poultry houses. The more common are house flies, little house flies and various species of blow flies. The house fly is the most persistent and most common pest. Besides being annoying, it also can spread certain poultry diseases and eggs of internal parasites. In addition, flies are important disseminators of many human diseases.

Development of Flies

Flies undergo four distinct stages of development—egg, larva (maggot), pupa (inactive developmental stage between larva and adult) and adult. Each stage requires a specific environment for development. Each female fly can deposit 400 to 900 eggs, within several weeks, in batches of 100 to 500 eggs each. Under favorable conditions, only a few reproducing females can create tremendous fly populations in succeeding generations. Since total suppression of adults is impossible, the most effective means of achieving fly control is to prevent development of the larvae.

During the summer, house flies mate and may begin to deposit eggs within 3 to 4 days after emerging from pupae. Eggs hatch in 8 to 24 hours. Larvae may mature in 4½ days or, under less favorable conditions, up to 2½ weeks or more may be required. Larvae have three stages of growth and molt their skins at the completion of each stage. The skin of the last larval stage forms a hard, brown puparium inside which the larva pupates and transforms into a fly. Adults may emerge from the puparium in as little time as 3½ days, more commonly in 4½ to 5 days, and under adverse conditions it may take several weeks. Thus, a generation of flies is possible every 10 to 14 days when temperature, humidity and other environmental factors are favorable.

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The usual range of dispersal of house flies is not well known. Marked flies have been trapped as far as 13 miles from the point of release and up to 6 miles away within 24 hours of release. They apparently may range from 1 to 3 miles quite commonly. The range of dispersal seems to be strongly influenced by odors, wind, temperature, humidity and other factors.

In Texas, house flies may continue limited development and reproduction during the winter, although prevailing temperatures greatly influence the rate. Some adults may survive the winter by hibernation, but they probably are unimportant in providing for buildups the following spring. Flies spending the winter as pupae probably provide for the first noticeable large population increase in spring.

The biology and life cycles of the little house fly and the blow flies are similar to that of the house fly. The little house fly is about half the size of the normal house fly and is almost entirely black. It prefers poultry manure for its egg laying. Little house flies seem to circle aimlessly in "play flights" around hanging objects. Blow flies are larger than the house fly and are black, gray or metallic green or blue. They often breed in poultry manure but prefer carcasses, egg waste and other animal matter for their development. Their buzzing and rapid, jerky flight help to distinguish them as blow flies.

Manure Management

In its natural state, poultry manure is an ideal fly-breeding medium. Moisture, temperature and organic matter requirements are adequate in unmanaged poultry wastes. Effective fly control is a problem best solved by manure management, whereby the highly suitable fly-breeding environment is altered, modified or eliminated by any feasible means. Chemical insecticides are valuable supplemental fly control tools, but alone they do not provide satisfactory control.

Fresh poultry waste furnishes ideal conditions for fly larva development, as it generally contains 60 to 80 percent moisture. House fly breeding *can be stopped* by quickly reducing the moisture content to 30 percent or less or by immediate liquefaction of fresh droppings in liquid pits. Drying of manure usually is preferable since odors are minimal as compared to liquid pits.

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DRY MANURE MANAGEMENT SYSTEMS

Dry (solid) manure systems vary according to farm design, location and climatic conditions. Basically, there are two effective types of management systems. One involves *frequent manure removal* (every 3 to 4 days during summer and every 5 to 7 days during cooler weather) and immediate thin spreading, storage or composting. The other depends upon *in-house or under-cage drying* with less frequent cleaning and disposal. The advantages of dry systems are simplicity, use of commonly available equipment, quick reduction of fly populations and lack of odor. Disadvantages include higher labor requirements, feather and dust problems, poor drying of manure during cool and rainy periods, improperly designed existing housing for thorough cleaning and little reduction in manure volume.

If a dry system utilizing *frequent manure removal* is used, facilities should be designed for rapid and thorough manure removal with labor-saving mechanical implements. Manure pads should be constructed of concrete or similar impervious substances. Posts or other obstructions hindering manure removal should be eliminated. Remove the manure every 3 to 7 days as needed to prevent fly development and immediately spread thinly on pasture or cropland to facilitate rapid drying. Where possible, plowing under within 2 to 3 days after spreading is desirable. Alternate but less effective methods are composting the manure under a tarp or plastic film until thoroughly digested or storing in fly-tight bins for later spreading.

In-house or under-cage drying manure management calls for maintaining the droppings at below 30 percent moisture. In more arid areas of Texas, this can be accomplished with few or no supplemental drying aids. In humid areas, drying must be hastened and facilitated by mechanical means and husbandry practices. Reducing the number of birds per cage, for example, in cage-layer operations can help to reduce the moisture content of under-cage droppings. Restricting water consumption, within the limits of good husbandry, helps reduce manure moisture content. Exhaust fans can be used to reduce air moisture content in the house and bring in drier fresh air.

Water lines and troughs can be made leakproof to eliminate wet spots which are highly favorable for fly development. A mechanical tiller, stirrer or aerator is valuable to break manure crusts and allow for drying and aerobic decomposition. Slatted, wooden drying racks suspended under cages help to provide additional exposed surfaces of droppings and promote aeration and drying. A combination of these practices may be necessary to reduce the manure moisture content to less than 30 percent and eliminate fly breeding. Manure should be removed whenever it becomes difficult to manage or has been subjected to unusual moisture exposure. It may then be disposed of by thin spreading, composting or storage in fly-tight bins.

LIQUID MANURE MANAGEMENT SYSTEMS

Few commercial units utilizing liquid manure systems are operative in Texas, but considerable interest is being expressed in such systems. The advantages of liquid systems are excellent fly control by rapid liquefaction, use of manure as a liquid fertilizer, a high degree of mechanization, less labor requirement and less strict water management. Disadvantages include considerable land use where lagoon systems are used, lack of adjacent land to dispose of liquid wastes as fertilizer, requirements for pumping and handling equipment and possible odor problems.

Liquid manure systems usually are limited to farms having adjacent crop or pasture land for liquid disposal or some facility for destruction. Two general liquid systems are in use. One involves frequent pumping out of liquids from shallow pits located beneath the wire floor or under cages. The liquid is then sprayed thinly on agricultural land or transferred to an open lagoon with an area of one acre per 15,000 birds. The other has under-cage pits flowing into a collection sump. The slurry is periodically removed and transferred to a lagoon or spread onto agricultural land.

Building Design Important

Since manure management is one of the most important considerations on poultry farms, the producer should design his facilities to provide efficiently for manure collection and disposal. No single specific type of building is applicable to every operation, but certain basic points should be considered. Avoid structures interfering with complete cleanout and sanitation, such as posts and water lines. Install water systems in a manner providing for leak-proof operation. Provide adequate ventilation and air movement, possibly including a fan system. Consider fly screening to prevent the migration of flies from the house, particularly in populated areas. Install waste-proof feeding systems when possible to avoid creating additional fly breeding areas.

Often existing houses can be modified or remodeled to provide for improved manure management. Before new construction or remodeling begins, the producer must decide upon an effective method of manure management. The method selected should determine the type of construction and facilities chosen for each producer's operation.

Table 1. Recommended Larvicides

Insecticides (listed alphabetically)	Formulation and strength	Dosage/1000 sq. ft. of manure surface	How to Apply*	Restrictions
Dimethoate (Cygon®)	0.5%	5-10 gal.	As even, coarse spray or with sprinkling can	Use only on droppings under caged birds or on manure piles. Avoid spray contact with birds and eggs. Do not contaminate feed or water.
Malathion	2.0%	5-10 gal.	As even, coarse spray or with sprinkling can	Avoid direct spray contact with birds and eggs. Do not contaminate feed or water.
Ronnel (Korlan®)	1.0%	5-10 gal.	As even, coarse spray or with sprinkling can	Use only on droppings under caged birds. Avoid spray contact with birds and eggs. Do not contaminate feed or water.
Zytron[1]	0.7%	5-10 gal.	As even, coarse spray or with sprinkling can	Use only on droppings under caged birds. Avoid spray contact with birds, eggs, cages or pens. Do not contaminate feed or water.

*Overall treatment of all droppings on a routine basis is not recommended. Small areas found to support dense larval populations should be sprayed as needed.
[1]Dow liquid fly larvicide.

Use of Insecticides

Chemical insecticides, properly chosen and applied, are useful and effective for fly control; however, insecticides alone will not provide complete fly control. For most effective fly control, insecticides should supplement sanitation and proper manure management practices.

Frequent, continuous use of an insecticide in one area can result in fly populations that tolerate and survive formerly recommended and permissible dosages. Resistance to one insecticide is sometimes accompanied by resistance to related insecticides. Several chemicals are available for fly control in poultry houses. Sold under many brand names, they may be formulated as baits, wettable powders, emulsifiable concentrates or dusts. Choose the most economical, approved insecticide and formulation that best suits the needs of your operation. Insecticides may be used to control larvae or adults as spot or overall treatments.

LARVICIDES

Larvicides are best used as *spot treatments only* to control maggots that develop in areas wet from a leaky watering device, rain, soft-shell eggs or diarrheic birds. *Overall treatments with larvicides on a regular, continuous basis are not recommended* because of questionable effectiveness, chances of increasing resistance, high cost of application and indiscriminate kill of many natural parasites and predators. Larvicides are best used to treat fly-breeding areas not eliminated by normal sanitation and cultural practices.

Water used in larvicidal sprays may cause additional moisture and fly problems in a dry manure management system. Use only the amount of water required for thorough coverage of droppings, or substitute fuel oil for the water. Exercise extreme caution with fuel oil to avoid fire hazards. Fuel oil also provides some larvicidal activity.

ADULTICIDES

Insecticides for adult fly control are used as residual surface sprays, space sprays, dry and liquid baits and resin-vapor strips. Surface sprays of certain insecticides usually are the most economical and effective method for controlling adult flies. Space sprays are useful when an immediate kill of large fly populations is desired. They are especially effective in knocking down flies congregated in enclosed areas such as egg rooms. Space sprays have no residual effect and must be used repeatedly at

Table 2. Space Treatment Recommendations

Insecticide and concentration	How to use	Remarks
Spray: Pyrethrins (0.1-0.25%) plus synergist (1.0-2.5%)	Spray directly on resting flies or fog in air where flies are numerous. Can be used with birds in house. Follow manufacturer's directions.	No residual effect on flies entering premises after treatment.
Resin-vapor strip: Dichlorvos (DDVP: Vapona®) Commercially prepared devices	Use according to manufacturer's directions	Useful in enclosures such as egg rooms or feed rooms. Do not contaminate feed or water.

Table 3. Residual Surface Spray Recommendations*

Insecticides (listed alphabetically)	Spray concentration	Amount to use /1000 sq. ft.	Restrictions
Dimethoate (Cygon®)	1.0%	1-2 gal.	Remove birds from building prior to spraying. Do not contaminate feed or water.
Malathion	2.5%	1-2 gal. Thoroughly spray all resting surfaces to point of runoff.	Birds do not have to be removed before spraying. Avoid contaminating feed or water. Do not spray birds directly.
Naled (Dibrom®)	0.3%	2 gal.	Birds need not be removed during spraying. Do not spray birds directly. Avoid contaminating feed or water.
	1.5%	1-2 gal.	Apply liberally. Remove birds from building prior to spraying.
Ronnel (Korlan®)	0.5-1.0%	3 gal.	Birds do not have to be removed before spraying. Do not spray birds directly. Do not contaminate feed or water.

*For maximum residual effect and to increase attractiveness, add 1 pound of sugar per 5 gallons of mixed spray.

frequent intervals. Dry and liquid baits help to control adults, especially when used with a surface spray. Resin-vapor strips are effective only in enclosed areas where they are unaffected by outside air movement.

To obtain the greatest benefit from adult sprays and baits, apply when newly emerged flies first become evident in the spring and reapply when the fly population appears to be increasing and the insecticide previously applied is no longer effective. Do not wait until the fly population has reached excessive numbers before using recommended insecticides. The quicker applications are made after flies are observed, the more females the insecticide will kill before they deposit eggs.

For maximum benefit from surface sprays, apply them where the flies rest—ceiling, beams, overhead wires, trusses, inside and outside wall surfaces and feed bin exteriors. Before spraying the interior, make certain that the insecticide used is approved for use inside the house when birds are present. After spraying inside with any insecticide, thoroughly flush water and, where possible, feed troughs with clean water. Also spray the outer walls of nearby buildings and grasses, weed, shrubs and trees adjacent to the poultry house. In the spring and fall, pay particular attention to sunny walls where flies congregate. During the summer, spray thoroughly the shaded areas under roofs and overhangs.

Thoroughly wet all sprayed surfaces but stop before the point of runoff. Spray the premises thoroughly; do not depend on spot spraying to effectively reduce adult fly populations.

Insecticide Precautions

Recommended insecticides can be used safely in poultry and egg production when handled properly. Insecticides improperly used are hazardous to the applicator, to birds and can result in injury or in illegal residues in meat and eggs. Handle insecticides with respect and *read the label* each time before mixing and applying chemicals. Do not rely on your memory.

The recommendations and precautions contained herein were current at the time of publication. Usage restrictions are subject to change, however. Always *read the label* before using any recommended material and follow all directions, precautions and restrictions.

Trade names are used only for information and clarification. No endorsement is implied nor discrimination of similar products is intended.

Table 4. Adult Fly Bait Recommendations

Insecticides for dry or liquid baits (listed alphabetically)	Remarks and restrictions
Dichlorvos (DDVP; Vapona®) Malathion Naled (Dibrom®) Ronnel (Korlan®) Trichlorfon (Dipterex®)	Commercially prepared liquid and/or dry baits of these insecticides are generally available. Use according to manufacturer's directions. Producers can make their own baits, dry or liquid, by following directions on the label of some concentrate formulations. When using baits, do not contaminate equipment, feed or water. Keep baits out of reach of birds, pets and children.

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